Respondent: AEP

At the last Electric Service Quality Workshop in September, Staff stated it would issue a short follow-up data request regarding power quality. The Commission recognizes that not everyone who receives this data request will have the experience or information to respond. However, we have circulated the data request to everyone so that everyone is aware of the on-going process related the electric service quality.

Over the course of the workshops we have discussed three broad categories of electric reliability problems: Sustained outages have been defined as interruptions in service lasting more than five minutes and requiring utility intervention to restore service; Momentary outages, for our purposes, have been identified as service interruptions of less than five minutes in which service is restored without utility intervention; Power Quality problems are deviations in the nature or character of the electricity which may affect the performance of customers' electric equipment.

1. **From a customer's perspective, how are power quality problems usually described/identified, i.e. what does the customer complain about?**

   Customers realize a power quality (PQ) problem when their equipment does not operate in the manner that the customer believes the equipment should operate. Residential and commercial customers would typically report flickering lights, lost data in their computers, or problems with cash registers and communications equipment. Industrial customers may report problems with variable speed motor drives and computer controlled processes or overheating equipment.

2. **Are the complaints and/or problems different for residential or small commercial customers versus large commercial or industrial customers? If so, please explain how the complaints are different.**

   Customers voicing concerns about PQ are typically commercial and industrial customers utilizing sensitive equipment. The type and level of concern varies with the type of customer. For example, voltage fluctuation may be a significant concern for industrial customers with sensitive manufacturing equipment. The same event may go unnoticed for a residential or commercial customer.

3. **What steps does your utility take to address power quality complaints?**

   Any PQ concerns expressed by customers are taken seriously by AEP, which has established a separate PQ group comprised of PQ engineering

professionals located throughout the eleven state service territory. Although more often than not directly involved in the PQ investigations, the PQ engineers also serve as consultants to other Company personnel, such as distribution technicians and line servicers.

AEP has been most successful addressing PQ concerns through case-by-case investigations that are usually conducted by a PQ engineer or customer services representative. When appropriate, PQ monitoring equipment is installed and data is collected and analyzed, with the nature of the case determining the data to be collected and reviewed. Typical information that is gathered could include voltage, current, and kW.

The first step in any PQ investigation is the most important step—communicating with the customer. The PQ engineer poses numerous questions to the customer in an effort to clearly determine the exact problem being experienced. The customer would typically be concerned with equipment not operating in the manner that the customer believes the equipment should operate. Next, based on the information obtained from the customer, the PQ engineer formulates a hypothesis. The hypothesis enables the PQ engineer to determine the type of monitoring equipment required, if any, and the best location for the monitor.

From the monitored data and the experience of the PQ engineer, a correlation can usually be made between the actual problems the equipment is experiencing and known utility and internal building electrical interactions. The solution to a PQ concern may be found to reside on the utility side of the meter, in which case, corrective actions are taken within the constraints of sound engineering and economics.

Alternatively, the investigation reveals that the PQ problem and resulting solution reside on the customer's side of the meter. Members of AEP's PQ group stay current with changes in technology on the customers', as well as the utility's, side of the meter. An understanding of the technologies and processes in use by customers is vital to their success. AEP continually monitors new industry developments, technologies, and solutions, allowing its PQ staff to provide credible consultation for PQ solutions on the customers' side of the meter. When an investigation identifies the solution as residing on the customer's side, most customers have an interest in protecting their equipment investment, whether it is the surge protector on a residential customer's computer or more sophisticated solutions for an industrial customer's machinery.

4. **Does your customer call center categorize power quality complaints separately?**

- **If so, how many power quality complaints have there been in the last 12 months? How were these complaints resolved?**
- **If not, please estimate how many power quality complaints there has been over the last 12 months and how they were resolved.**

AEP considers a complaint to be a second contact by a customer following the Company's initial opportunity to investigate and address a concern. This classification practice, as well as the types of concerns considered to be power quality, may or may not be consistent with other Indiana electric utilities. For 2003 AEP registered six Indiana PQ complaints. The nature of the six complaints involved equipment not operating in an expected manner, flickering lights, or television interference. The complaints were resolved by the Company through investigation, including the use of voltage recorders and fault locators, and, when appropriate, corrective action such as equipment replacement and tree trimming. In the case involving television interference, an action to correct the problem could not be identified but the customer expressed satisfaction with the Company's thorough investigation.

5. **Are there actions customers can take to insulate their equipment from power quality problems? If so, please explain what actions could be taken.**

Yes. As initially discussed in response to Question 3, when a PQ investigation confirms that the service provided by the utility is adequate and the PQ concern resides on the customer's side of the meter, there are actions that can be taken by the customer to protect investments in end-use equipment. Depending on the specific circumstances, the required corrective actions could include the installation of batteries, ride-through technologies, surge suppressors, lightning arrestors, or alarm systems specifically designed to protect internal electrical processes and electronic devices. Additionally**,** all customers should verify that their internal electrical system, especially the grounding system, is compatible with the requirements of their equipment investments.